eleven years in this humble position, which was much below his capacity.

Towards the end of 1848 he began a review of the smaller stars with the Reichenbach equatoreal, and the help of the Berlin map of the heavens, in order to search for new planets. He was probably encouraged to this work by the recent discoveries of Astræa, Hebe, Iris, Flora, and Metis, which had fallen to the lot of Hencke, Hind and Graham, in a short space of time. On 1849 April 12, he discovered his first planet, Hygeia, and the following year, within an interval of a few months, two others, Parthenope and Egeria. Become famous by these discoveries, he received the gold medal of this Society and the Lalande prize from the Academy of Paris, and was appointed in 1851 Professor of Astronomy of the Royal University of Naples. At the death of Capocci, in 1862, he was appointed director of the Observatory of Capodimonte.

He continued his observations in search of new planets for several years. Besides the three already mentioned, he discovered Irene (four days after Hind), Eunomia, Psyche, Massilia, Themis, Ausonia, and Beatrix. He alternated these astronomical observations with theoretical work, both in astronomy and mathematics, publishing a long series of important memoirs. De Gasparis was of strong physique, and worked hard, interrupting his observations only by brief readings of the classics in which he so much delighted.

About 1885, he began to suffer from creeping paralysis, which gradually became aggravated, and in 1889 the condition of his health was such as to render the fulfilment of his many official duties impossible. He therefore established himself in a country house not far distant from the observatory where he had worked for about forty-five years.

Many honours were bestowed on him; he became a member of the Academy of Italy, as well as of several foreign societies; and he was a senator of the kingdom from 1861.

He was elected a Foreign Associate of this Society 1850 December 13.

Amédée Ernest Barthélemy Mouchez was born in Madrid on 1821 August 24, was educated in Paris and Versailles, and at the age of sixteen entered the Naval School at Brest. He was gazetted midshipman in 1839, lieutenant in 1845, and captain in 1861. The most important event in his naval career was his splendid defence of Havre during the Franco-Prussian War. This side of his life is so little known to those familiar with his career as an astronomer, that a few sentences in relation to it are perhaps not out of place here. "Le capitaine de vaisseau Mouchez fut nommé par le Gouvernement de la Défense nationale, le 18 octobre 1870, commandant des forces de terre et de mer de la place du Havre, ville presque ouverte, que défendaient à peine quelques forts détachés. . . . Il entreprit de

couvrir les approches de la ville par plusieurs lignes de retranchements et par des redoutes, dont il choisit les positions et traça immédiatement les plans, et, grâce à l'énergique impulsion qu'il sut donner aux travaux de défense, les forts, qui constituaient alors les seuls ouvrages de la place, furent au bout de quelques semaines reliés par une ligne fortifiée qu'il arma de pièces de marine . . . L'ennemi avait envahi la Normandie, et la ville de Rouen se sentit menacée; sa municipalité appela aussitôt M. Mouchez et le chargea d'effectuer autour de Rouen des travaux de défense: mais, avant qu'il eût le temps d'exécuter le plan qu'il avait conçu . . ., la ville de Rouen fut occupée par l'armée du général Von Goeben. Les troupes qui couvraient Rouen se retirèrent vers le Havre, . . . et y trouvèrent un abri qui leur permit de se réorganiser. Dès la prise de Rouen l'ennemi tenta une pointe vers le Havre; mais il rebroussa chemin, en apprenant que la ville avait été mise en état de défense; il renouvela cette tentative . . . mais il fut arrêté . . . M. Mouchez perfectionnait les ouvrages de défense . . . et conserva, jusqu'à la signature de la paix, le commandement de la place du Havre et la flotille de la Seine." *

His naval career was also distinguished by some admirable survey work. He spent the five years 1856–1861 in surveying the coasts of Paraguay and Brazil, and a similar period later on the survey of the coast of Algeria; and this work led to his appointment as Member of the Board of Longitudes. In 1874 he organised the expedition to St. Paul to observe the Transit of *Venus*. The climatic conditions of this island of the southern seas made success very problematical, and there were also exceptional dangers in disembarking and otherwise; but the position was so favourable for observation that the risks were undertaken, and, thanks to Mouchez, the enterprise was successful in every way. He gave an account of the expedition before the five Academies in 1875 October, and he was promoted Contre-Amiral and elected Member of the Academy of Sciences.

After the death of Le Verrier, M. Mouchez was appointed (on 1878 June 27) Director of the National Observatory, and he held the post of director till his death in the past year.

From the time of his appointment the staff have displayed the greatest energy, both in carrying on and completing investigations already commenced and in initiating new ones. During his directorate, the arrears in the annual volumes were made up, twenty-one volumes of Annals being published in his fourteen years of office. The re-observation of Lalande's 48,000 stars was immediately pushed forward, and progress has been so rapid that the work of observation is now practically complete, and half of the great catalogue is already printed and distributed, while another quarter is in the press. The catalogue is founded

* *Discours de M. Louis Brindeau, Maire de la Ville du Havre, prononcé aux obsèques de M. Mouchez, le Mardi, 28 Juin* 1892.

on 500,000 observations made at Paris during the last fifty years. Other meridian investigations of a fundamental character have received careful attention from M. Loewy and M. Périgaud. In 1885 the Brothers Henry constructed a photographic object-glass, and commenced a series of experiments in astronomical photography, the success of which is too recent to dwell upon here. M. Loewy was given every assistance in his project for *équatoriaux coudés*, and the work on aberration and refraction on which he proposed to employ one or more of them. Recently a new spectroscopic department, under M. Deslandres, has been established at the observatory. The *Bulletin Astronomique* was founded by M. Mouchez; and a summer observatory was established on the Pic du Midi.

For the last eight years Admiral Mouchez has been of opinion that the Paris Observatory should be transferred to a new site. On 1884 February 4 he presented a memoir to the Academy of Sciences on the necessity for constructing a branch to the observatory. He pointed out that the present site was in a part of the city becoming more and more populous, and proposed to retain there only the museum, an office for calculations, and three or four instruments for instruction; and to construct near Paris an observatory of the first-class, furnished with all the improvements of modern science, the cost of which could be defrayed by selling the ground outside the present observatory. This proposal was negatived by a large majority of the committee appointed to consider it, there being a strong feeling against selling any portion of the present observatory territory. But Admiral Mouchez never gave up the idea. In his subsequent reports he again and again referred to the proposal. He considered that the employment of instruments of great precision or of great optical power were alike impossible at the present observatory owing to the instability of the ground in the one case, and the opacity of the Paris atmosphere in the other. But nothing had yet been done in the direction of moving the observatory at the time of his death.

But it will be as the initiator of the international scheme for charting the heavens that M. Mouchez will be remembered. In presenting the first photograph taken by the Brothers Henry to the French Academy in 1885, Admiral Mouchez remarked on the advantages which a complete photographic survey of the heavens would secure. Dr. Gill had offered to co-operate with the Paris Observatory in such a survey, and it was then estimated that six or eight years would suffice for the work.

In 1887 an international conference was summoned to Paris by Admiral Mouchez, acting under the auspices of the French Academy, and supported by the Government, for consideration of this plan in detail; and a thoroughly representative assembly of nearly sixty astronomers and savants was the result.

The conference resolved generally that recent advances in astronomical photography made it imperative that the astronomers

of our epoch should jointly undertake a photographic survey of the heavens at the present time, taking care to determine the constants which would allow of the positions and magnitudes of stars being determined with the greatest possible precision. Eighteen observatories have provided themselves with instruments essentially of the same pattern, and most of them are now at work on this chart. Details, far more numerous than was at first anticipated, were settled at two other conferences in 1889 and 1891; or by correspondence between members of sub-committees. But it would be difficult to over-estimate the importance of Admiral Mouchez's energy and labour in this preliminary work. His activity in communicating with the sub-committees, his tact and courtesy on occasions of divergence in opinion, his keenness in perception of the wisest course, have smoothed difficulties which, if not perhaps insurmountable, have at times bid fair to delay the undertaking very seriously. With his help a start has been effected which will go far to ensure a successful issue. One of the last things M. Mouchez did as Director, was to establish (in 1892 February) a micrometrical service for measuring the photographs.

Towards the end of his life, Admiral Mouchez suffered from almost total deafness, which was a serious hindrance to some of his work; but the devotion of his friend, Miss Klumpke, did much to obviate the difficulties that might otherwise have arisen. From her many of the particulars in the present brief notice have been gathered. We learn from her that on 1892 June 24, "whether feeling the need of a well-deserved rest, or with some mysterious prevision of his approaching end, the Director convoked MM. Davanne, Loewy, Wolf, Paul and Prosper Henry, and read out the programme he had prepared on various subjects under discussion, requesting them to share with him the responsibility of their solution. Having thus made, as it were, his scientific will, having confided to their hands the great work he had begun, he returned to his beautiful country-seat at Wissons. On arriving there he declined all nourishment and laid down to rest, and before another dawn he had passed peacefully away, surrounded by his loving and devoted family." He died on 1892 June 29.

Lewis Morris Rutherfurd was born at Morrisania, N.Y., on 1816 November 25. He graduated at Williams College, where he gave evidence of considerable scientific ability and zeal. He was called to the Bar in 1837, but having married a lady of some fortune early in his career, in 1849 he abandoned the law to devote all his energies to science. He first came to Europe, and remained there for some time travelling and studying. On his return to New York he erected a small observatory (transit, clock, and equatoreal) at the back of his house, and his observations were from the first of considerable importance. In 1863 he published in *Silliman's Journal* a paper on the spectra of stars, Moon, and planets, which is the first published attempt at classi-